

# WP 300

## Materials testing, 20kN



### Learning objectives/experiments

- tensile tests
- plot stress-strain diagrams
- Brinell hardness test
- together with the accessories
  - ▶ compression tests
  - ▶ bending tests
  - ▶ cupping tests
  - ▶ shear tests
  - ▶ testing of plate and coil springs

### Description

- compact, simple experimental unit for basic destructive tests
- tensile tests, Brinell hardness test

A solid understanding of the properties of materials is essential for technical and scientific professions. This knowledge helps select the suitable material, monitor production and processing and ensure the requirements in terms of a component. The materials test provides the necessary data in a reproducible and precisely quantified manner. The tensile test, bending test and hardness test are all part of classic destructive materials testing.

The range of experiments with WP 300 covers tensile tests and Brinell hardness tests in the base unit.

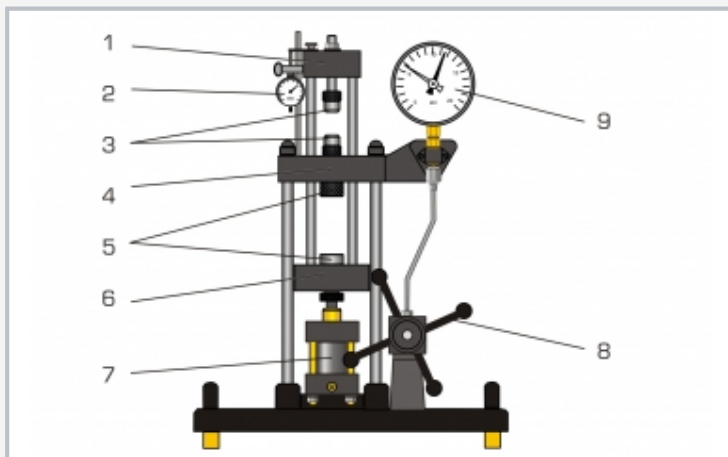
Compression, bending, shear and cupping tests can be conducted using the accessories. Plate and coil springs can also be tested. The experimental unit has been developed specifically for experiments in small groups and is characterised by a clear design, simple operation and accessories that are easy to exchange.

The tensile specimens are clamped between the upper cross member and the crosshead. The hardness specimens are secured between the crosshead and lower cross member. The test force is generated by means of a hand-operated hydraulic system and displayed on a large force gauge with drag indicator. A dial gauge measures the elongation of the specimens.

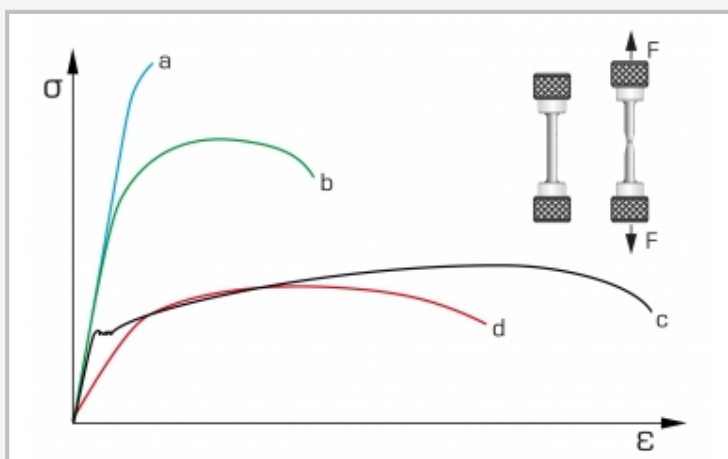
The experimental unit can also be equipped with electronic force and displacement measurement. Using the WP 300.20 system for data acquisition, the measured values for force and displacement can be transferred to a PC where they can be analysed with the software.

# WP 300

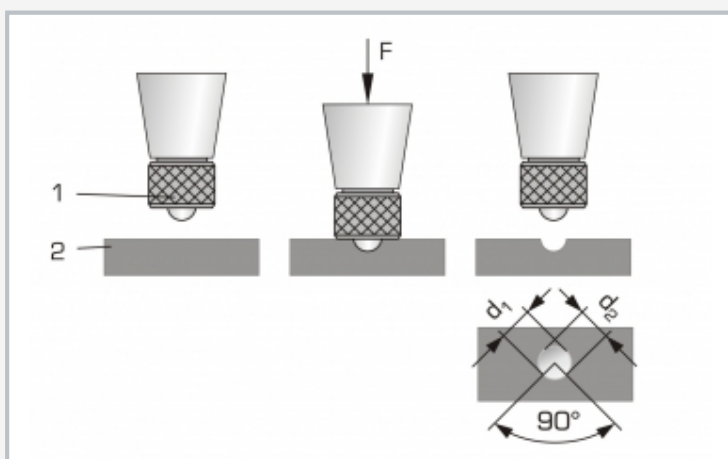
## Materials testing, 20kN



1 upper cross-member, 2 dial gauge for elongation, 3 clamp for tensile specimens, 4 crosshead, 5 compression piece and pressure plate, 6 lower cross-member, 7 hydraulic cylinder, 8 hand wheel, 9 force gauge



Stress-strain diagram for various materials: a hardened steel, b tempered steel, c annealed steel, d alloyed aluminium



Brinell hardness test: 1 hardened steel ball, 2 specimen; F test load,  $d_1$  and  $d_2$  dimensions of the impression surface

### Specification

- [1] classic experiments from destructive materials testing
- [2] tensile tests, Brinell hardness test
- [3] extensive accessories available for further experiments
- [4] generation of tensile and compressive forces
- [5] forces generated by hand-operated hydraulic system; no power supply required
- [6] force gauge, pointer instrument with drag indicator
- [7] dial gauge for determining the elongation
- [8] materials of hardness specimens: aluminium, copper, steel, brass
- [9] tensile specimens according to DIN 50125: aluminium, copper, steel, brass
- [10] system for data acquisition (WP 3000.20) available as an option

### Technical data

Test force: max. 20kN  
 Stroke: max. 45mm  
 Free installation space for specimens: 165x65mm  
 Tensile specimens: B6x30mm, DIN 50125  
 Hardness specimens: LxWxH 30x30x10mm  
 Sphere for hardness testing: diameter 10mm

#### Measuring ranges

- force: 0...20kN, graduation: 0,5kN
- travel: 0...20mm, graduation: 0,01mm

LxWxH: 610x500x860mm  
 Weight: approx. 48kg

### Scope of delivery

- 1 experimental unit
- 1 device for hardness test
- 1 force gauge
- 1 elongation dial gauge
- 4 sets of tensile specimens (16 pieces)
- 4 sets of hardness specimens (16 pieces)
- 1 set of instructional material

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## Materials testing, 20kN

Universal material tester, 20 kN

### Optional accessories

020.30020	WP 300.20	Data acquisition system
Tensile test		
020.30002	WP 300.02	Set of 4 tensile specimens, Al, Cu, St, CuZn
020.30021	WP 300.21	Set of 4 tensile specimens, Al
020.30022	WP 300.22	Set of 4 tensile specimens, Cu
020.30023	WP 300.23	Set of 4 tensile specimens, St
020.30024	WP 300.24	Set of 4 tensile specimens, CuZn
020.30014	WP 300.14	Clamping device for flat tensile specimens
020.30025	WP 300.25	Set of 4 tension specimens, flat, Al, Cu, St, CuZn
Compressive strength test		
020.30005	WP 300.05	Compression plates for compression tests, large
020.30070	WP 300.70	Set of 4 compression specimens, gypsum
020.30071	WP 300.71	Set of 4 compression specimens, wood
020.30072	WP 300.72	Set of 4 compression specimens, plastic
Brinell hardness testing		
020.30003	WP 300.03	Set of 4 hardness specimens, Al, Cu, St, CuZn
020.30031	WP 300.31	Set of 4 hardness specimens, Al
020.30032	WP 300.32	Set of 4 hardness specimens, Cu
020.30033	WP 300.33	Set of 4 hardness specimens, St
020.30034	WP 300.34	Set of 4 hardness specimens, CuZn
020.30012	WP 300.12	Measuring magnifier for Brinell hardness test
Bending test		
020.30004	WP 300.04	Bending test device
Cupping test		
020.30011	WP 300.11	Device for cupping tests
020.30041	WP 300.41	Set of 5 cupping specimens, Al
020.30042	WP 300.42	Set of 5 cupping specimens, Cu
020.30043	WP 300.43	Set of 5 cupping specimens, St
020.30044	WP 300.44	Set of 5 cupping specimens, CuZn
Shear test		
020.30010	WP 300.10	Device for shear tests, double-shear
020.30013	WP 300.13	Device for shear test, single-shear
020.30052	WP 300.52	Set of 5 shear specimens, Cu
Spring tests		
020.30006	WP 300.06	Experimental setup for spring tests, helical spring, 2 sets
020.30007	WP 300.07	Experimental setup for spring tests, disk spring
Other accessories		
020.30009	WP 300.09	Laboratory trolley